EPSON SG-615 series Crystal Oscillators-SMT Plastic molded package

SOJ HIGH FREQUENCY CRYSTAL OSCILLATOR

EPSON SG-615 series

- High-density mounting-type SMD
- A general-purpose SMD with heat-resisting cylindrical AT- cut crystal unit and allowing almost the same soldering temperature as SMD IC.
- Cylindrical AT crystal unit builtin, thus assuring high reliability
- Provided with output enable function
- Law current consumption

● Specifications (characteristics)

Item		Symobl	615P	615PTJ	615PH	Remarks
			Specifications			
Output frequency range		fo	1.0250 MHz to 36.0000 MHz	26.0001 MHz to 66.6667MHz		
Power source voltage	Max. supply voltage	V_{DD}-GND	-0.3 V to +7.0V			
	Operating voltage	V_{DD}	5.0V ±0.5V			
Temperature range	Storage temperature	T_{STG}	-55 ℃ to +125 ℃			Stored as bare product after unpacking
	Operating temperature	T_{OPR}	-20℃ to 70 ℃ (-40 ℃ to 85 ℃)			55 MHz Max. (-40 ℃ to +85 ℃)
Soldering condition		T_{SOL}	Twicce at under 260 ℃ within 10 s or under 230℃ within 3 min			
Frequency stability		△f/fo	B: ±50 X10 $^{-6}$ C: ±100 X 10 $^{-6}$			B type is possible up to 55 MHz
Current consumption		Iop	23 mA Max.	35 mA Max.		No load condition
Duty	C-MOS level	t w/t	40% to 60%	--	40% to 60%	C-MOS load: 1/2 V_{DD}
	TTL level		45% to 55%		--	TTL load: 1.4V
Output voltage		V_{OH}	V_{DD} -0.4 V Min	2.4 V Min..	VDD -0.4 V Min	
		(Ioh)	-400 µA		-4 mA	
		V_{OL}	0.4 V Max.			
		(IoL)	16 mA	8 mA	4 mA	
Output load condition (fan out)	C-MOS	CL	50 pF Max.	--	50 pF Max	
	TTL	N	10 TTL Max.	5 TTL Max.	--	CL ≤ 15pF
Output enable/ disable input voltage		V_{IH}	2.0 V Min.	3.5 V Min.	2.0 V Min.	I_{IH} =1 µA Max. (OE= V_{DD})
		V_{IL}	0.8 V Max.	1.5 V Max.	0.8 V Max.	I_{IL} =-100 µA Min.(OE=GND) I_{IL} =-500 µA Min.(OE=GND)PTJ
Output disable current		IoE	12 mA Max.	28 mA Max.	20 mA Max	OE=GND
Output rise time	C-MOS level	t_{TLH}	8 ns Max.	--	7 ns Max..	C-MOS load 20%→80% V_{DD}
	TTL level			5 ns Max.	--	TTL load: 0.4V→2.4V
Output fall time	C-MOS level	t_{THL}		--	7 ns Max.	C-MOS load 80%→20% V_{DD}
	TTL level			5 ns Max.	--	TTL load: 2.4V→0.4V
Oscillation start up time		tosc	4 ms Max.	10 ms Max.		Time at 4.5 V to be 0 s
Aging		fa	±5 X 10^{-6} / year Max.			Ta=+25℃, V_{DD}= 5V, first year
Shock resistance		S.R.	±20 X 10^{-6} Max.			Three drops on a hard board from 750 mm or excitation test with 29400 m/s^2 X 0.3 ms X 1/2sine wave in 3 directions.

Note : • Unless otherwise stated, charactertics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.
• External by-pass capacitor is recommended.

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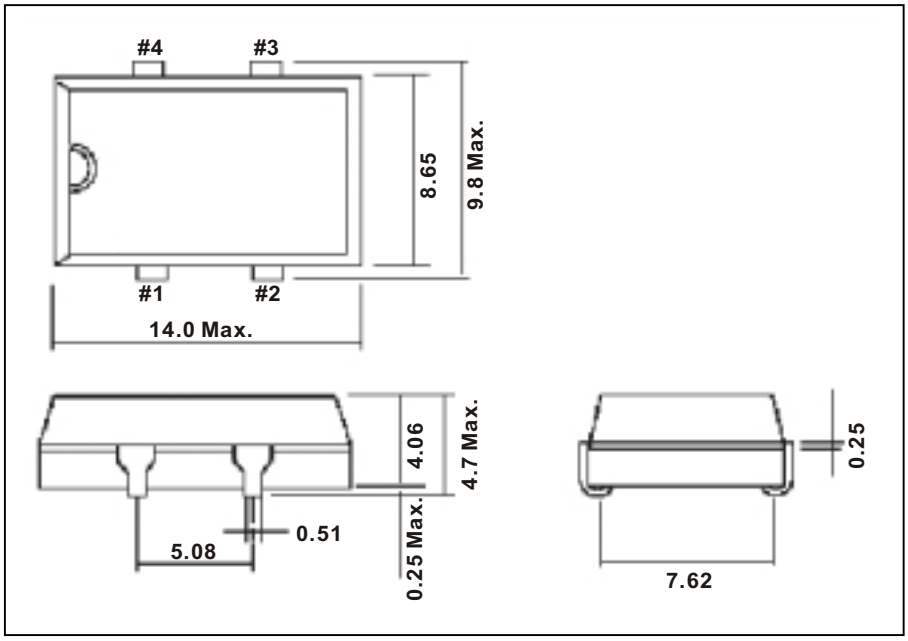
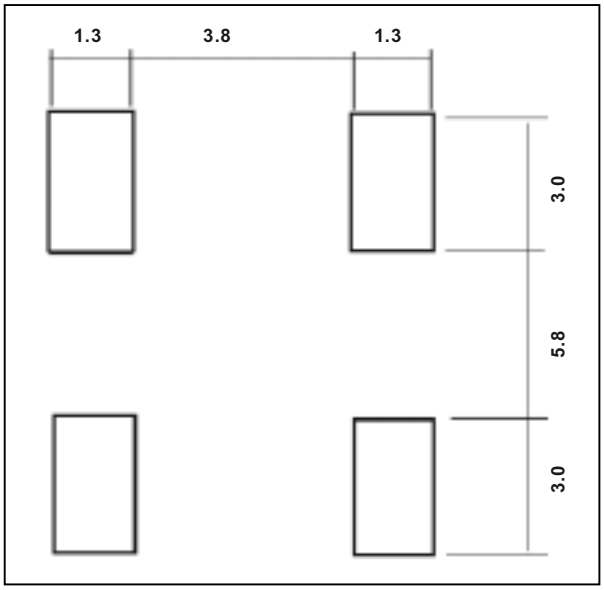
- **External dimensions** (Unit: mm)



No.Pin	terminal
1	OE
2	GND
3	OUT
4	V_{DD}

- **Recommended Soldering pattern** (Unit: mm)



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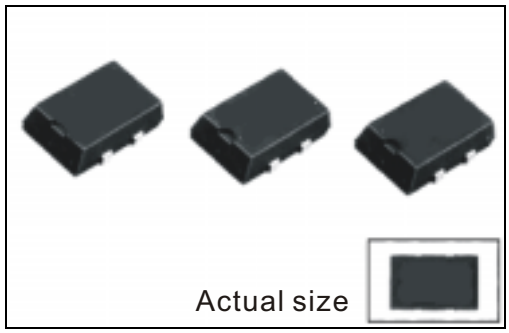

■ Specifications (characteristics)

Item		Symbol	615PTW/STW	615PHW/SHW	615PCW/SCW	Remarks
			Specifications			
Output frequency range		fo	55.0001 MHz to 135.0000 MHz		26.0001 MHz to 135.0000 MHz	
Power source voltage	Max. supply voltage	V_{DD}-GND	-0.5 V to +7.0 V			
	Operating voltage	V_{DD}	5.0 V☛0.5V		3.3V☛0.3 V	
Temperature range	Storage temperature	T_{STG}	-55 °C to +125 °C			
	Operating temperature	T_{OPR}	-20 °C to+70 °C		-40 °C to + 85 °C	
Soldering condition (lead part)		T_{SOL}	Twice at under 260 °C within 10 s or under 230 °C within 3 min.			
Frequency stability		Δ f/fo	B: ☛50 x 10^{-6} C: ☛100 x10^{-6}			-20 °C to +70 °C
			M: ☛100 x 10^{-6}			40 °C to +85 °C
Current consumption		I_{OP}	45.mA Max.		28 mA Max	No load condition
Output disable current		I_{OE}	30 mA Max.		16 mA Max.	OE=GND
Output disable current		I_{ST}	50 µA Max.			ST=GND
Duty	C-MOS level	tw/t	-	40 % to 60 %		C-MOS load: 1/2V_{DD}
	TTL level		40 %to 60 %	-		TTL load: 1.4 V
Output voltage		V_{OH}	V_{DD}-0.4 V Min.			I_{OH}= -16 mA (*TW/HW)/-8 mA(*CW)
		V_{OL}	0.4 V Max.			I_{OL}= -16 mA (*'TW/HW /8 mA(*CW)
Output load condition (fan out)		C_L	15 pF Max.			
Output enable disable input voltage		V_{IH}	2.0 V Min.		0.7 V_{DD} Min.	OE,ST
		V_{IL}	0.8 V Max.		0.2 V_{DD} Min.	OE,ST
Output rise time	C-MOS level	t_{TLH}	-	4 ns Max.	4 ns Max.	C-MOS load: 20 %→ 80 %V_{DD}
	TTL level		4 ns Max.	-	-	TTL load: 0.4 V→2.4 V
Output fall time	C-MOS level	t_{THL}	-	4 ns Max.	4 ns Max.	C-MOS load: 80 %----→20 % V_{DD}
	TTL level		4 ns Max.	-	-	TTL load: 2.4 V→0.4 V
Oscillation start up time		t_{osc}	10 ms Max.			Time at 4.5 V to be 0 s
Aging		fa	☛5 x 10^{-6}/year Max.			Ta=+25 °C, V_{DD}=5 V
Shock resistance		S.R.	☛20 x 10^{-6} Max.			Three drops on a hard board from 750 mm or excitation test with 29400 m/s^2 x 0.3 ms x 1/2 sine wave in 3 directions

☐ Operating condition and Frequency band